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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
WHALEY, PABLO S	

ART UNIT	PAPER NUMBER
1631	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/828,846	BINDER ET AL.	
	Examiner	Art Unit	
	PABLO WHALEY	1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 November 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☒ Claim(s) *1, 18, and 32* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Request For Continued Examination

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/10/2008 has been entered.

Status of Claims

Claims 1-32 are pending.
Claims 1-32 are rejected.

Priority

This application has been granted the benefit of priority to US Application No. 09/691, 405, filed 17 October 2000.

Objections

Claims 1, 18, and 32 are objected to because of the following informalities: Claims 1, 18, and 32 (lines 14-15) are grammatically incorrect, and should recite "out of a range of none, one, or more than one…". Appropriate correction is required.

Withdrawn Rejections

The rejection of claims 1-5 and 11-31 under 35 U.S.C. 103(a) as being obvious by Zimmerman, Thompson, Kim, and Anderson et al. (WO/1999/039298; Filed 03/02/1999) is withdrawn in view of applicant's amendments filed 11/10/2008.

The rejection of claims 6-10 and 22-24 under 35 U.S.C. 103(a) as being obvious by Thompson, Kim, Diamond, and Kopecky is withdrawn in view of applicant's amendments filed 11/10/2008.

The provisional rejection of claims 1-17 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-3, 7, 8, and 17 of co-pending Application No. 09/691,405, is withdrawn in view of the abandonment mailed for case 09/691,405 on 04/17/2008.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-1732 are rejected under 35 U.S.C. 101 because these claims are drawn to non-statutory subject matter. These claims are rejected for the following reasons.

The claimed subject matter is directed to a process for identifying whether a patient test sample is associated with specific systemic autoimmune diseases based on antibody levels present in the test sample. A claimed process is statutory under 35 U.S.C. 101 if: (1) it is tied to a particular machine or apparatus of statutory subject matter under 35 U.S.C. §101 (i.e. a machine, manufacture, or composition of matter), or (2) it transforms a particular article into a different state or thing (In re Bilski, 88 USPQ2d 1385 Fed. Cir. 2008; In re Comiskey, Fed. Cir., No. 2006-1286).

Regarding the required tie to a particular machine or apparatus, the claimed subject matter is not limited to a particular apparatus or machine. In the instant case, the claims are directed a computer-implemented method for storing data, receiving data, applying a clustering algorithm to data, and providing a statistical decision as output but are missing specific devices used to implement these steps. Preamble limitations that require the claimed process to comprise machine implemented steps will not be considered sufficient to convert a process that otherwise recites only mental steps into statutory subject matter. To qualify as a statutory process, the claims should require use of a machine within the steps of

the claimed subject matter or require transformation of an article to a different state or thing. Insignificant data gathering or post-solution activity in the claimed subject matter will not be considered sufficient to convert a process that otherwise recites only mental steps into statutory subject matter. The applicants are cautioned against introduction of new matter in an amendment.

Regarding the transformation test, the claimed subject matter does not recite a physical transformation of matter. For example, while the claims are directed to a method for identifying whether a patient test sample is associated with specific systemic autoimmune diseases based on antibody levels present in the test sample, the claims do not require any physical assays to perform these steps [See In re Grams, 12 USPQ2d 1824 (Fed Cir. 1989)]. This rejection could be overcome by amendment of the claims to recite a step wherein an article is reduced to a different state or thing (e.g. physical assay), or a step wherein data representing a physical object or substance that is obtained by a specific physical process is sufficiently manipulated or changed (e.g.. raw data into a particular visual depiction of a physical object on a display) [See In re Abele, 684, F.2d at 908-909, CCPA, 1982]. The applicants are cautioned against introduction of new matter in an amendment.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.
>
> This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 6, 10-18, and 22-32 are rejected under 35 U.S.C. 103(a) as being obvious by Zimmerman et al. (Electrophoresis, 1995, Vol. 16, p.941-947), in view of Cabello et al. (Int. J. Biomed. Comput., 1991, Vol. 27, p.77-93), and in view of Kanai (US 5,619,990; Issued: April 15, 1997).

Zimmerman teaches a computer-implemented method for identifying whether patient autoantibody samples are associated with autoimmune disease [Abstract]. In particular, Zimmerman teaches obtaining quantitative staining patterns from patients with autoimmune diseases and normal controls [Abstract, Section 2.1], which shows obtaining quantitative sample and reference data wherein at least one data set is associated with none of the diseases. The stained blots are scanned and stored in a database for analysis [Section 2.2, 2.3, 2.4.1, Fig. 3]. Zimmerman shows applying a multivariate discriminate analysis for comparing data of known groups to unknown samples using [p.944, Col. 2, ¶ 2], and providing a statistically derived decision as output [p.945, Col. 2 and Table 1]. Furthermore, their multivariate approach for classifying unknown samples is based on "normal" and "diseased" sample sera, wherein each is described by variables representing a particular staining behavior [p.946, Section 4]. The computer system comprises software and hardware components for implementing the above processes [Section 2.2 and 2.3]. Zimmerman shows the calculation of Chi-squared values (i.e. concordance value) and distance metric values (d') wherein mean known vectors are compared to unknown blot patterns [p.944, Col. 2, ¶ 3]. Zimmerman shows discarding data if values exceed a certain distance value (i.e. cutoff value) [p.945, Col. 2 and Table 1]. Zimmerman shows increasing said minimal distance and recalculating the analysis [p.945, Col. 2], which is an implicit teaching for a second threshold value. The entire process is implemented on a computer system comprising hardware and software devices [Section 2.2, 2.3].

Zimmerman does not teach applying a k-nearest neighbor process to the quantitative values of the sample data and the reference data sets to produce decisions indicating whether, out of a range of none, one or more than one of said systemic autoimmune diseases, the patient test sample is associated with none, one, or more of said specific SADs, as in claims 1, 11-13, 18, 25-28, 32.

Zimmerman does not teach providing a statistically derived decision identifying which of the said SADs the patient sample is associated with if the decision indicates that the patient test sample is associated with one or more SADs, as in claims 1, 18, and 32.

Cabello teaches a k-nearest neighbor algorithm for classifying different types of heart disorders [Abstract]. In particular, the k-nearest neighbor classifiers are assigned to known and unknown data sets [Section 2, p.79-80], and distance calculations are determined [Section 3]. The k-nearest neighbor algorithm is applied to quantitative values of sample data for classification to a plurality of different disease classes [p.83, p.87, Fig. 2]. This method is beneficial for improved data classification [p.78-79].

Kanai teaches an automated method for making a medical diagnosis based on discriminating attributes [Abstract]. In particular, Kanai teaches a generic discriminant analysis techinque for determining the degree to which a test data group is associated with multiple disease groups or a non-disease control group [Fig. 4, Fig. 7, Col. 6, lines 20-30, Col. 7, lines 30-50, Ref. Claims 20, 28, 30]. The method is based on nearest neighbor distance between test and reference data [Abstract, Col. 1, Col. 2, Fig. 4, Fig. 7(a)]. Kanai provides statistically derived decisions that identify which specific disease the patient test sample is associated with and if there is no association [Fig. 8, 9, 10]. This method is beneficial for determining to which of multiple disease groups a patient belongs [Col. 1, lines 5-10].

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the discriminant analysis method of Zimmerman by applying a k-nearest neighbor process to the quantitative values of the sample data and the reference data sets to produce decisions indicating whether, out of a range of none, one or more than one of said systemic autoimmune diseases,

the patient test sample is associated with none, one, or more of said specific SADs, as in claims 1, 11-13, 18, 25-28, 32, since Cabello teaches a generic discriminant analysis algorithm for classifying multiple types of signal data [Abstract, Fig. 2], and since Petrovecki shows statistical methods can be used to predict disease in patients [Abstract]. The motivation would have been to improve autoimmune disease diagnosis using a discriminant analysis technique that minimizes the possibility for misclassification and allows for the classification of complex data sets, as suggested by Cabello [p.78, last ¶, p.83, p.87, Fig. 2] and Zimmerman [Abstract].

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the discriminant analysis method of Zimmerman by providing a statistically derived decision identifying which of the said SADs the patient sample is associated with if the decision indicates that the patient test sample is associated with one or more SADs, as in claims 1, 18, and 32, since Kanai teaches a discriminant analysis techinque for determining the degree to which a test data group is associated with multiple disease groups [Fig. 4, Fig. 7, Col. 6, lines 20-30, Col. 7, lines 30-50, Ref. Claims 20, 28, 30], and since Zimmerman applies clustering to patients with both muscle and inflammatory disorders [Abstract, Fig. 3, Fig. 6]. The motivation would have been to provide a more robust disease diagnosis tool by determining if a patient is associated with multiple disease groups, as suggested by Kanai [Col. 1, lines 5-10].

Claims 1-6 and 10-32 are rejected under 35 U.S.C. 103(a) as being obvious by Zimmerman et al. (Electrophoresis, 1995, Vol. 16, p.941-947), in view of Cabello et al. (Int. J. Biomed. Comput., 1991, Vol. 27, p.77-93), and in view of Kanai (US 5,619,990; Issued: April 15, 1997), as applied to claims 1, 6, 10-18, and 22-32, above, and further in view of Osterland (CLINICAL CHEMISTRY, 1994, Vol. 40, No. 11(B), p.2146-2153).

Zimmerman, Cabello, and Kanai make obvious a computer-based method for identifying patients associated with none, one, or more autoimmune diseases, as set forth above.

Zimmerman, Cabello, and Kanai do not teach the use of SLE antibody profiles and antigens (Scl-70), as recited in the claims 2-5 and 19-22 and the elected species.

Zimmerman, Cabello, and Kanai do not teach receiving reference data sets from an automated system over a network connection, as in claims 8 and 9.

Osterland teaches well known quantitative autoantibody tests and data sets that include antibody concentration and flow cytometry data [Abstract, p.2148, Table 4, Table 5, p.2151, Col. 2, last ¶], including antibodies and antigens comprising SLE, Scl-70, Jo-1 (myositis), and SSA, as recited in the claims 2-4 and 19-22 and the elected species.

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the method made obvious by Zimmerman, Cabello, and Kanai by using reference data and sample data having quantitative values representing levels for a plurality of specific autoantibodies, as in claims 1, 18, and 32, since Osterland teaches well known quantitative autoantibody tests and data sets that include antibody concentration and flow cytometry data [Abstract, p.2148, Table 4, Table 5, p.2151, Col. 2, last ¶]. The motivation to use of combination of these antibodies and antigens would have been to provide a more robust test for classifying patients with systemic autoimmune disease [p.2149, Col. 2, p.2152, Col. 1].

Claims 1-32 are rejected under 35 U.S.C. 103(a) as being obvious by Zimmerman et al. (Electrophoresis, 1995, Vol. 16, p.941-947), in view of Cabello et al. (Int. J. Biomed. Comput., 1991, Vol. 27, p.77-93), in view of Kanai (US 5,619,990; Issued: April 15, 1997), and in view of Osterland (CLINICAL CHEMISTRY, 1994, Vol. 40, No. 11(B), p.2146-2153), as applied to claims 1-6 and 10-32, and further in

view of Kopecky (Design and Implementation of the Internet-Based Medical Expert System ToxoNet, 1999, p.1-153).

Zimmerman, Cabello, Kanai, and Osterland make obvious a computer-based method for identifying patients associated with none, one, or more autoimmune diseases, as set forth above.

Zimmerman, Cabello, Kanai, and Osterland do not teach transmitting display data to a remote computer system, as in claim 7.

Zimmerman, Cabello, Kanai, and Osterland do not teach receiving reference data sets from an automated system over a network connection, as in claims 8 and 9.

Kopecky teaches an internet-based medical expert system (ToxoNet) automated classification of seriological data [p.1]. In particular, Kopecky teaches a server for storing and retrieving data from the database [Section 3.2.2], and transmitting data across a network [Fig. 3.3], and remote computing [Section 3.2.1, and Section 6.2].

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the method made obvious by Zimmerman, Cabello, Kanai, and Osterland by transmitting display data to a remote computer system, as in claim 7, and receiving reference data sets from an automated system over a network connection, as in claims 8 and 9, since Kopecky teaches an internet-based medical expert system (ToxoNet) comprising a server for storing and retrieving data from the database [Section 3.2.2], hardware and software for transmitting data across a network [Fig. 3.3], and remote computing [Section 3.2.1, and Section 6.2]. The motivation would have been to improve disease diagnosis by providing improved communication and remote automated decision support to clinicians.

Response to Arguments

Applicant's arguments filed 11/10/2008 that Zimmerman, Thompson, Kim, and Anderson do not teach quantitative values representing a plurality of specific autoantibodies, and do not teach applying a k-nearest neighbor process to the quantitative values of the sample data set and the reference data sets to

produce a decision indicating whether out of a range of none, one, or more than one of said systemic autoimmune diseases (SADs), the patient test sample is associated with none, one, or more than one of said SADs have been fully considered.

Applicant's arguments filed 11/10/2008 that Zimmerman, Thompson, Kim, and Anderson do not teach providing a statistically derived decision identifying which of the said SADs the patient sample is associated with if the decision indicates that the patient test sample is associated with one or more SADs, as in claims 1, 18, and 32, have been fully considered and are persuasive.

Therefore, these rejections are withdrawn. However, new grounds of rejections have been applied in view of applicant's arguments and amendments filed 11/10/2008.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pablo Whaley whose telephone number is (571)272-4425. The examiner can normally be reached on 9:30am - 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marjorie Moran can be reached at 571-272-0720. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Pablo S. Whaley/

Patent Examiner

Art Unit 1631

/John S. Brusca/

Primary Examiner, Art Unit 1631